

## Implementation of Research and Development Based on Patent Natural Ingredients and Potential Utilization of Tradition Medicine

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**Abstract.** *The results of research and development based on natural ingredients for traditional medicines become an interesting topic to discuss at this point; it's shown from increasing number in utilization. The use of traditional medicine especially on natural ingredients at this moment becomes effective solution to increase the level of market acceptance in herbal extracts, including an affordable purchase from potential utilization of natural resources which are owned. By using Matheo Patent XE Ver 10.2 as methodology of searching, we can know potentials useful through strategy, research and development, patent analysis and patent collaboration among users in utilization of Natural Ingredient for Traditional Medicine. From the data result shows majority in the field of chemistry for human necessity related to Health; Amusement; Medical or Veterinary Science; Hygiene sectors with total patent 108, family 65. The use of patent analysis is a way to find how the development of technology and products that have been produced and how commercial processes connecting with technology users, especially in traditional medicine. From the data that exist in particular of patents, it is critical to identify the number of patents that has been registered through the innovation process development including technology dissemination is used.*

**Keywords:** *Implementation, Matheo Patent XE Ver. 10.2, Natural Ingredients, Potential Utilization, Traditional Medicine.*

### 1. Introduction

Changing the paradigm from research and development (R&D) result especially in patent analysis, nowadays becomes such a value for the uses to find information related to the patent that has been registered in world. Performing the ideal form can be associated with changing the previous mindset from only get scientific publications or satisfaction of the researchers over ignorance into research and development oriented on basic benefits.

Patent document defines much information that can be traced in technology development. Any technology that contained in patent documents describes of novelty and technical review in research. It could be the keys to see the differences in methodologies and system that provide valuable information on the patent application and particular confidentiality. As (Cohen et al., 2000) "Patents become weapons in mutually

reinforcing, non-cooperative strategic interactions where firms feel increasingly compelled to license either because they need to protect themselves from suits or from being blocked, or they want to prevent rivals or use patents as trade chips in negotiations". Apart from bargaining and transaction cost issues, patents on research tools can also create commercialization hurdles (OECD, 2002). The globally high number of patent applications reveals that a vast amount of information is available for use in the area of technology management (Kortum and Lerner, 1999). However, limitations of patent data as an information source must be recognized (Basberg, 1987).

Patent data can be used as a requirement for measuring technology foresight, deliver strategic to business units, products, technological fields or inventors, this enables a more precise competitor analysis. Diversification on the product at this moment is very indispensable element to

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 Received: 12 April 2016 ; Revised: 23 Juni 2016; Accepted: 19 Agustus 2016  
 Doi: <http://dx.doi.org/10.12695/ajtm.2015.9.1.2>  
 Print ISSN: 1978-6956; Online ISSN: 2089-791X.  
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 School of Business and Management-Institut Teknologi Bandung

achieve especially in modern era through the implementation of R & D activities. It can be seen from the number of kinds products are very diversified in the business process to support the needs of the user. And also must be understood as a strategic information source, which contributes valuable information to the effective and efficient management of knowledge technology. The strategic value of patent information becomes evident in its contribution to better decision-making in relevant areas of the research and also for enhancing competitiveness external stakeholders and analysts whose perception of the firm's technological competence can have a significant impact on the company's stock market performance (Ernst, 2003).

Demand for traditional medicine currently indicated at a relatively high level of public awareness, in consuming drugs. It can be an opportunity in the development of existing and potential business prospects for the drug industries. Including R & D results into user needs like medicine derived from plants that are traditional. Traditional medicine, which is the potential Indonesia plant can participate in solving this problem in health sectors and at the same time acquiring and utilizing the opportunity to serve as elements in the system, with the policy of the Minister of Health Indonesia in 1999 to develop and harness the medicinal plants native for pharmaceutical needs in Indonesia.

The need for traditional medicine is currently the solution to compete for high drug prices for users, alternative reducing the problem by exploiting the natural ingredients derived from plants as a cheaper substitute. The use of natural ingredients as the drug tend increased with the presence of the issue back to nature and prolonged crisis which resulted in a decline in purchasing power of modern drugs relatively high price. Natural materials are also considered drugs have almost no side effects and are economical.

The use of traditional medicine is needed to empower natural potentialities that exist, in particular, that can be an alternative to traditional medicine. The needs of the development of the natural ingredients for traditional medicines can be seen from the many benefits and uses the result in implementation, one of can be known from patent potentialities useful through strategy, research, and development, analysis and collaboration. Also, describe methods of patent utilization searching as shown in figure 1. This is very necessary to measure the level of development of the use materials of traditional medicine using software Matheo Patent XE Ver. 10.2. With primarily existing data through patent search possibilities of usage can be seen widely in the productive efforts and potential, so the fulfillment of health needs can be clarified based on existing uses.

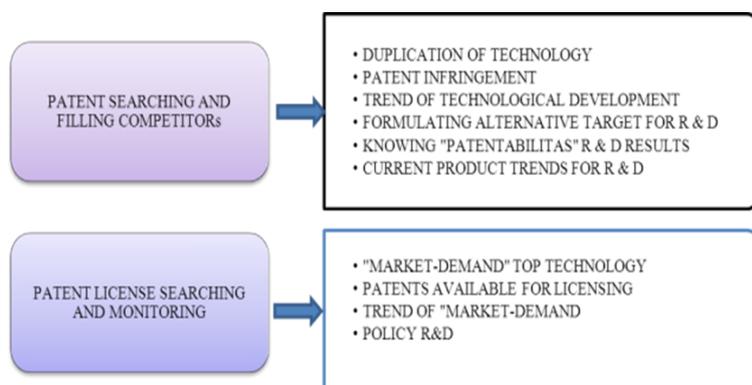


Figure 1. Usefulness of Patent Searching

## 2. Literature Review

### 2.1. Natural Ingredients and Use as a Traditional Remedy

The use of natural materials, either as a drug or any other purpose seems highly needed, especially with the existence of the issue of back to nature. Traditional medicine and medicinal plants widely used for preemptive community efforts, notably in promote and rehabilitative. While many people assume that the use of herbs plants, traditional medicine or relatively more secure than drug synthesis. Sufficient information will help society more carefully to choose and traditional medicine products or medicinal plants in the quest for health.

Potential utilization of natural plants for traditional medicine have been using and done with human civilization, where the plant is a warehouse of chemicals that have an assortment of benefits including drugs for various diseases. For natural nutritious plants making capability for medicine and herbal medicine is hereditary and heritage rooted strongly in the community. The natural vegetation which is the raw material of traditional medicine are spread across the entire territory of Indonesia, an example in the tropical forests of Indonesia there are 30,000 species of plants, and approximately 9,600 species known as drugs, but only 200 species have been used as raw materials in the traditional medicine sector. Cultivation of medicinal plant develop opportunities

regardless still very open broadly in line with the industry growing herbs, medicinal herbs, traditional pharmacy, and cosmetics. The use of traditional medicine is generally considered safer than the use of modern medicine, because traditional medicine has side effects are relatively less than modern medicine. Assumptions of natural medicine are the medicine preparations, both in the form of traditional medicine and pharmacy, either implicit (fresh or dried), extracts, compound or group of compounds derived from pure nature, which is the natural remedy is a medicine plant origin.

The use of medicinal plants among the community is vast, ranging from flavoring and industrial raw material drugs and cosmetics. However, in the system of Ministry of public health, the role of natural medications has not been fully recognized, even though empirically the benefits of natural medicines have been proven. The steps of traditional drug development are in many ways certain approaches so that the traditional form of medicine found been proven efficacy and safety, can be justified scientifically and meet the medical indications, namely drug pharmacy. Figure 2., define many advantages of natural medicine with an integrated loop that knowing relationship among the utilization such as side effect, bioactive compound, pharmacological effect and metabolic disease and degenerative also derivative of the uses in content.

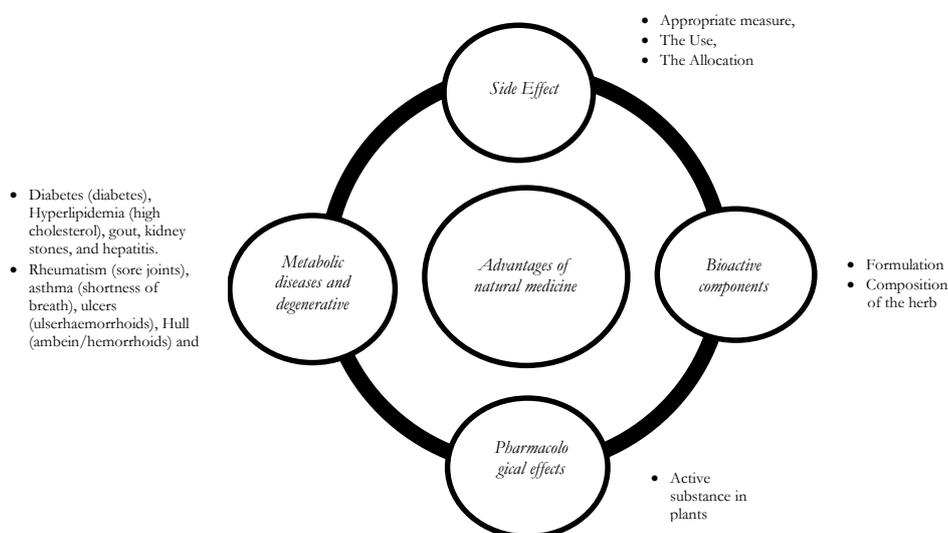


Figure 2. Advantages of Natural Medicine

## 2.2. R & D on Traditional Medicine

Transfer of technology in R & D and licensing of Intellectual Property Right (IPR) products raises complex and have difficult problems. In general, developing countries want IPR owner for licensed technology that allows the guarantee to the holder of license to be able to replicate the technology, for that matter about the concept of technological limitations associated with the outcome or realization of the technology refers to the fields of industry, it is necessary related to with the method of transfer technology or transfer the know-how. Development of underlying technology in a developing country depends on the presence a variety of technological capacity and ability to obtain technology from abroad to complement national efforts and research as well as the growth of technology that was created in the country (Hendrix, 2011).

The results of R & D shows that Indonesia is a rich country in biodiversity can be used as a cure all kinds of diseases. Medicines derived from plants called herbal remedies often used, it has minimal side effects even there were not found any side effects. Also, another advantage is the processing of herbal remedies, such as boiled or mashed to make it easy for the community in its use.

Many herbs have been used as Indonesia drugs or cosmetics, ranging from traditional herbal medicine, and formulated pharmacy. Chemical compounds plants have been developed as a raw material for the drug. Figure 3, show how the basic patent information can deliver substance from natural ingredient and a function from implementation commercialization scheme.

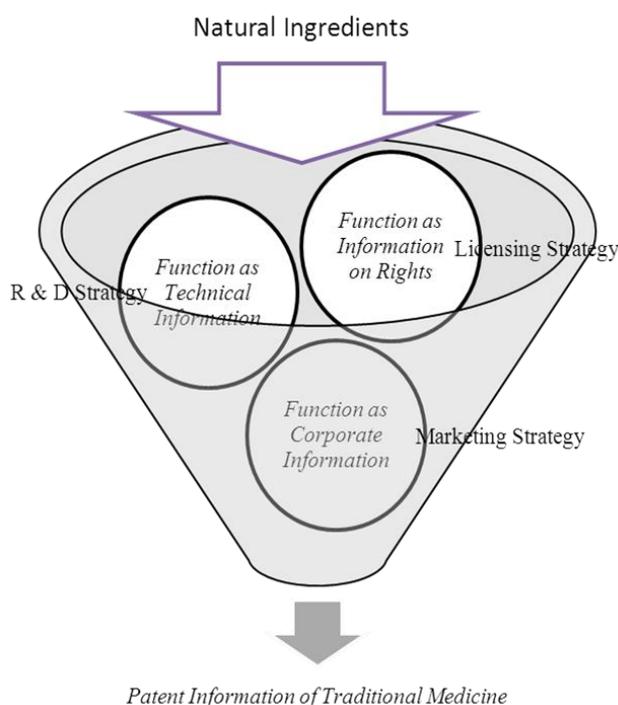


Figure 3. R & D on IPR Traditional Medicine

One of the basic principles of traditional medicine is a process (display) a slow (but be constructive), unlike chemical drugs can directly react (but is destructive/ruin) this because traditional medicine instead of the active compounds. Traditional medicines derived from medicinal plant parts are sliced, dried, and crushed. If we want to get a compound that can be used safely, medicinal

plants have to go through the process of extraction, separated, physically and chemically purified (oil). Of course the process need of significant raw materials in amount. The need or demand for such medicinal plants for the user and other stakeholders, particularly industry and traditional medicine drug/pharmacy now has a tendency of increasing in line with the

development in seeking treatment best medicine for the healing of various types of existing disease. So many medicinal plants utilization activities carried out by the criminals and the drug/herbal medicine industry pharmaceuticals both inside and outside forest areas. Drug/pharmaceutical industry in develop countries seek for source of the raw material medicinal plants which have high potential plants, including in Indonesia.

Utilization of medicinal plants is inseparable from the understanding content of compounds/active ingredients contained in the medicinal ingredient itself. The importance of knowledge active ingredient medicinal plants has been studied since the time of ancient Greece, where scientist Hippocrates (459-370 BC) believed to be the first researchers who make use of medicinal plants as ingredients research trials with use more than 200 types of plants (Sukandar et al, 2014). The active ingredient is produced through metabolic processes in plants which referred to secondary metabolites, such as classes of alkaloids, tannins, terpenoids and steroids. The implications of the knowledge content active ingredient which is the basis for determining the target type of the disease to be treated and the doses used for drug manufacturers as well as medicinal plants also still can't be consumed in vain. Medicinal plants still have side effects when not paying attention to a measure, time of use, as well as how to use the right.

The high demand for medicinal products derived directly from medicinal plants led to a predictable trade value will continue to increase. Based on records of Department of Agriculture (DoA, 2007) the value of commerce in herbal remedies, dietary supplement, nutraceutical, and so forth in the world in the year 2000 alone reached US \$ 40 billion. In 2002 increased to US \$ 60 billion, and by 2050 is estimated to be US \$ 5 trillion, with an increase of 15% per year, higher when compared to the growth in trade value of modern conventional medicine that only 3% per year.

The development of medicinal plants not only the use of the active compounds contained in medicinal plants such as primary products but also extracts the active compounds into secondary products (simplicial) to be developed as a product derivatives. This becomes highly prospective regarding economic value. For example, the primary product diversification (Rhizome) medicinal plant as Zingiberaceae secondary products (simplicial) has the added value of 7 – 15 times, while the processing of Rhizome extract provides added value becomes as big as 80 – 280 times (DoA, 2007).

### **3. Methodology**

This research papers use the qualitative research methodology, approach to study literature through analysis documents of the patent database with data mining and information related to the topic of study, by focusing on seeking the answers to the problems, the study mainly on patent natural ingredients for traditional medicine. Data mining is one of method or processes for extracting hidden patterns from a collection of particular data that emphasize data mining is the most important stages that transform data into a patent information (Yanhong and Runhua, 2007). Data mining and information are done with three approaches, namely:

1. Literature Study  
Browsing information related to the topics and issues from various sources, such as books, journals, articles or papers of other scholars;
2. Patent Searching  
Analysis of patent database through document utilization natural ingredient for traditional medicine, using Matheo Patent XE Ver. 10.2 which is sourced in WIPO database.
3. Interviews and focused discussion  
The interview is intended to gain information on a research topic from experts associated with the object of investigation through a review. The discussion will be focused to obtain information about traditional medicine issues in Indonesia, a research study that has been and will be done to overcome

these problems. Then final stage is the extraction of the data and information obtained by each approach.

The purpose of this study is to find information related to research topics through an international patent database that connected to R & D of natural Ingredients for traditional medicine. The other target of searching was to define data analysis for potential market and the user that already apply for commercial interest and also to know the trends of technology and current research in progress and reverse engineering of technological information sourced from the patent

#### **4. Result and Analysis**

##### *4.1. Patent Information of Natural Ingredients for Traditional Medicine*

Mapping of natural materials technology, related to information for traditional medicine practiced to acquire the technological developments used in the comparison. It's done by looking at technology trends through International Patent Classification (IPC) listed all over the world as well as the potential utilization of existing patent.

The tools used in seeing technology trends are valid through Matheo Patent XE Ver. 10.2. In detail the techniques of searching documents or previous technologies in the same field, the adjacent (prior art) with the use of all information, either in the form of a patent or a published patent document or patent that is not like a journal, the tabloids, magazines and so on. The necessary perform data searching is the patent document because the document contains specific publication patent that delivers technical details that reveal the function of findings. Most of the information cannot be obtained from other sources.

Interpretation in terms of R & D on traditional medicine is crucial in looking at the level of users including the result of technology. Many ways and methods to be used in looking at the side of the technological developments that are currently

"in" inside the global market, so the involvement of industry sectors require enormous attention in the form R & D results (Hendrix, 2014).

Patent document is a document that is full and rich in information technology that is publicly accessible and easily understood by the public. In addition to information technology, patent documents contain data about the data inventors, applicants, patent application date, destination countries patent applications, and much more. Through information and data, can be obtained benefit them if patents are not registered in Indonesia, then we can use or adapt these technologies freely (free-to-operate) because according to the rules prevailing in the patent that the patent is protected only where the patent is registered. In addition, through the date of registration or certificate granting patents it is known that certain patents are still in a period of protection or expired protection. If an expired patent protection, the technology in the patent information has become public domain.

Another benefit of patent documents can know the trend of technology developed at this time, knowing the player technology and even competitors who master certain technologies. And analysis proper understanding of the information in patent documents can seize opportunities or adapt the technology gap and utilize these technologies can even develop into a better direction over existing technologies. This intelligent of competitive activity, potential for new inventions on the development of existing technologies is also quite large (Hendrix and Ferianto, 2016). That searching of patent can work well when we do by input the name of a keyword which probably in line with the subject that wants to search. By dividing two keyword subject, especially in directing the close relationship with the subject can search dominant data of patent that consist on Matheo Patent XE Ver. 2.10. If we were wrong when entering separating the keyword it can't provide us significantly data that suit for our result and closely ask the right subject to be enter again.

Strategic information based on large volumes of professional information such as patents or scientific papers. The integration of information maps, indicator and analysis in your decision process increase competitiveness. It can be seen in the description of the level of maturity of technology or have been examined will can give an instantaneous (snapshot) about the status of the maturity of a technology at certain times of the development programs conducted in technology. Including technology readiness level is to a measurement system that supports the systematic assessment of the maturity of a readiness or specific technologies and comparison between types of readiness or maturity of the different technologies. The readiness of technology can be interpreted as an indicator that shows how ready/mature a technology to be applied and adopted by users/potential users to be utilized or applied according to its use.

#### *4.2. Patent Analysis of Natural Ingredients for Traditional Medicine*

Large number patents that exist and related to traditional plants show positive trends in the development of health sciences. It's become critical in the development of traditional medicines, through patent analysis that required identifying the form of strategy, research and development, patent analysis, and patent collaboration among users. With patent analysis we can see the benefit in looking at the usage of technologies that are already registered and utilization by users. It means patent documents are a valuable reservoir of technical and commercial knowledge.

The potential usefulness of patent data becomes more highlighted as the process of innovation becomes more complex, the cycle of innovation becomes shorter, and the market demand becomes more volatile (Yoon and Park, 2003). With uses Matheo Patent XE Ver. 10.2, we can know analysis include Applicants, Inventors, Dates,

Technologies and Countries, Groups defined by the user, Patent family, and Legal Information. The analysis brings us to important key elements in activities such as Competitor technology positioning, innovation, and investment policies, research evaluation, technology trends, patent portfolio analysis, R & D and research team detection, patent and competitiveness monitoring especially in the field of natural ingredients for traditional medicine. In general, patent analysis utilizes bibliometric data that include such information as patent number, type of document, title, inventor, international patent classification, date of application, and etc. (Gupta and Pangannaya, 2000).

The information patent is very significant to cover and search, as long as we can provide the right path of our mean in the result of searching. The potential utilization it's mean we can find how many of the patent data that can cover whole of natural ingredient for traditional medicine by seeing the uses in using material of the traditional plant in herb sectors. We can find 108 Patent and 65 Family data on natural ingredient for traditional medicine that registered through WIPO fields.

In analysis patent information we can find data from figure 4. abstract keyword for natural ingredient and traditional medicine that show invention of technology that originally found by R & D process have 63 items, Method defined as a procedure, technique, or way of doing something, especially in accordance with a definite plan have 26 items, and Effective Component define as a new substance of R & D that used in order to have final result have 8 items related to natural ingredient for traditional medicine.

The keyword of searching becomes the important element for a better document that wants to achieve and can define the majority of the data that consist in data mining.

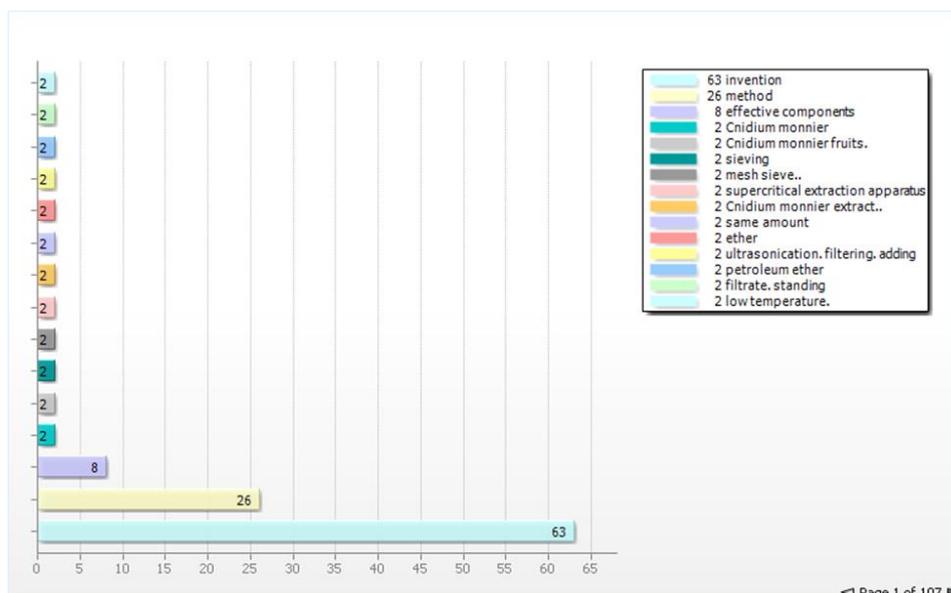


Figure 4. Abstract Keyword for Natural Ingredient and Traditional Medicine

Especially for the inventor (someone who has made an intellectual contribution to the claimed invention) that work on the field of traditional medicine and use natural ingredient as a research subject and registered the patent in WIPO can be found in figure 5.

From data collecting we can find all result of inventor came from university researcher in China with large 2 inventions with

description; Jin Qi Xu (from Center for Materials Innovation and Department of Chemistry, Washington University in Saint Louis, Missouri), Junping Kou (Institute Of Pathogen Biology, Chinese Academy Of Medical Sciences), Boyang Yu (Massachusetts Institute of Technology), Jin Qi (University of Minnesota), and Danni Zhu (China Pharmaceutical University).

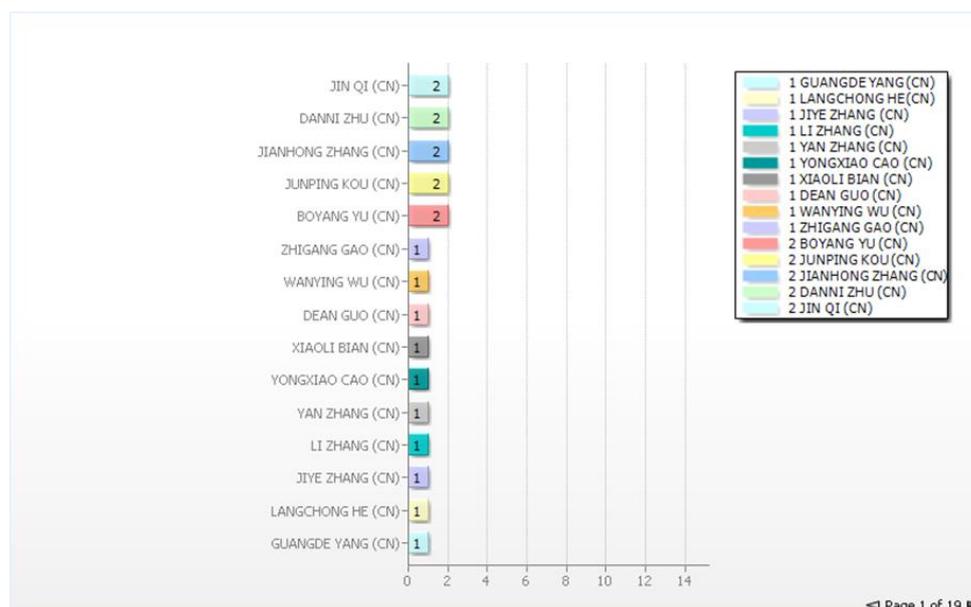


Figure 5. Inventor Natural Ingredient and Traditional Medicine

Applicants that use the invention applies to enhance the capacity development of

traditional medicine most of them come from university laboratory as shown in figure

6. With description three application from Shanghai Institute of Materia Medica, Chinese Academy of Science (Drug Development), two application from University Xian Jiaotong (R & D Medicine) and two application from University China

Pharma (R & D Medicine). But rarely traditional herb for medicine until now stills produce traditional for preventive disease. Especially for light symptom of illness that need fast countermeasure handling.

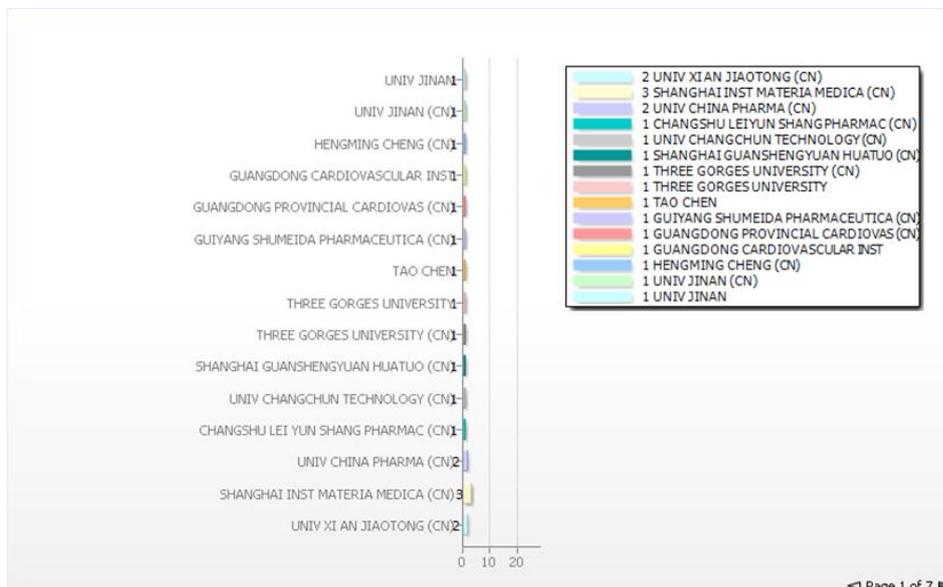


Figure 6. Applicant in Natural Ingredient and Traditional Medicine

From description WIPO Field on figure 7., natural ingredient and traditional medicine all range in Chemistry field, we can find most of the usefulness apply in field of pharmaceutical 68 (refers to area of application, not a technology), field of Measurement 19 (this field covers a broad variety of different techniques and applications), field of Food Chemistry 14 (refers to implementation on industry), field of Chemical Engineering 12 (refer to field that covers technologies at the borderline of chemistry and engineering. It refers to apparatus and processes for the industrial production of chemicals), field of Medical

Technology 5 (refer to high technology for process production and analysis) and field of Biotechnology 5 (refer to separate field in application, and commonly can be apply in generic combination from other field about 30 %).

Most of the result utilization area still the majority in field of Chemistry that orientation on particular uses in process, method, and production are in the common implementation of the development of invention. And area of information technology is broken down into more fields and thus differentiated at a delicate level.

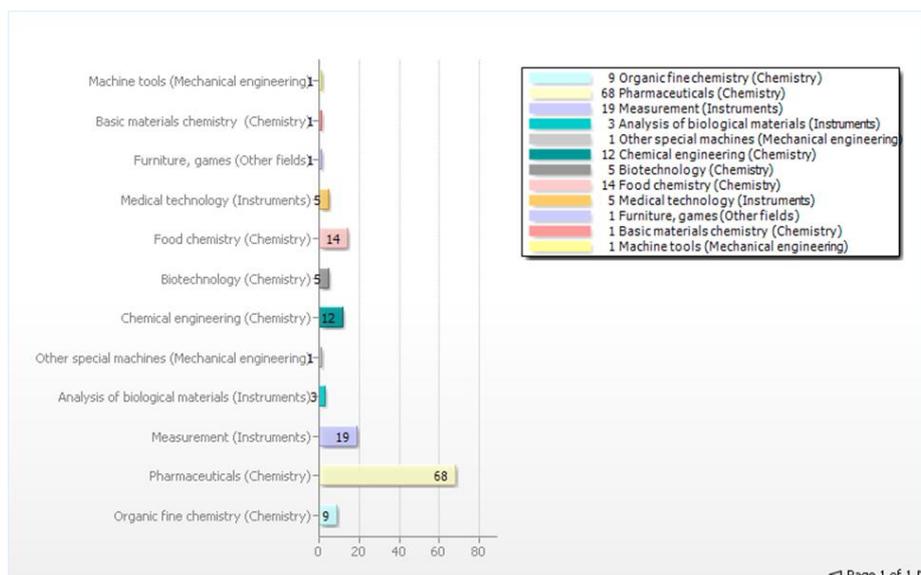


Figure 7. WIPO Field in Natural Ingredient and Traditional Medicine

If we want to see description from International Patent Classification (IPC) Full Class that provides a hierarchical system of language independent symbols for the classification of patent and utility models according to the different areas of technology shown in figure 8.

Deliver many field of utilization define 17 field on A61P9/10 (A: Section Human Necessities, A61 Medical or Veterinary Science; Hygiene, A61P Specific Therapeutic Activity of Chemical compound, A61P9/10, for treating ischemic or atherosclerotic diseases, e.g. antianginal drugs, coronary vasodilators, drugs for myocardial infarction, retinopathy, cerebrovascular insufficiency, renal arteriosclerosis). 9 Field on A61K31/704 (A: Section Human Necessities, A61 Health; Amusement; Medical or Veterinary Science; Hygiene, A61K Preparations For Medical, Dental, or Toilet Purposes (devices or methods specially adapted for bringing pharmaceutical products into particular physical or administering forms A61J3/00; chemical aspects of, or use of materials for deodorization of air, for disinfection or sterilization, or for bandages, dressings, absorbent pads or surgical articles A61L; {compounds per se C01, C07, C08, C12N}; ; soap compositions C11D; {micro-organisms per se C12N}), A61K31 Medicinal preparations containing organic active

ingredients, A61K31/704 attached to a condensed carbocyclic ring system, e.g. sennosides, thiocolchicosides, escin, daunorubicin {digitoxin A61K31/7048}. 8 field from A61K31/7048 (A: Section Human Necessities, A61 Health; Amusement; Medical or Veterinary Science; Hygiene, A61K Preparations For Medical, Dental, or Toilet Purposes (devices or methods specially adapted for bringing pharmaceutical products into particular physical or administering forms A61J3/00; chemical aspects of, or use of materials for deodorization of air, for disinfection or sterilization, or for bandages, dressings, absorbent pads or surgical articles A61L; {compounds per se C01, C07, C08, C12N}; ; soap compositions C11D; {micro-organisms per se C12N}), A61K31 Medicinal preparations containing organic active ingredients, A61K31/7048 oxygen as a ring hetero atom, e.g. leucoglucosan, hesperidin, erythromycin, nystatin {digitoxin or digoxin}), 4 field from A61K31/343 (A: Section Human Necessities, A61 Health; Amusement; Medical or Veterinary Science; Hygiene, A61K Preparations For Medical, Dental, or Toilet Purposes (devices or methods specially adapted for bringing pharmaceutical products into particular physical or administering forms A61J3/00; chemical aspects of, or use of materials for deodorization of air, for disinfection or sterilization, or for bandages, dressings,

absorbent pads or surgical articles A61L; {compounds per se C01, C07, C08, C12N}; ; soap compositions C11D; {micro-organisms per se C12N}), A61K31 Medicinal preparations containing organic active ingredients, A61K31/343 condensed with a carbocyclic ring, e.g. coumaran, bufuralol,

bufenolol, clobenfurol, amiodarone and 3 field from G01N33/15 (G: Section Physics, G01 Measuring; Testing, G01N Investigating or Analysis Materials by Determining their Chemical or Physical Properties, G01N33/15 Medicinal Preparations.

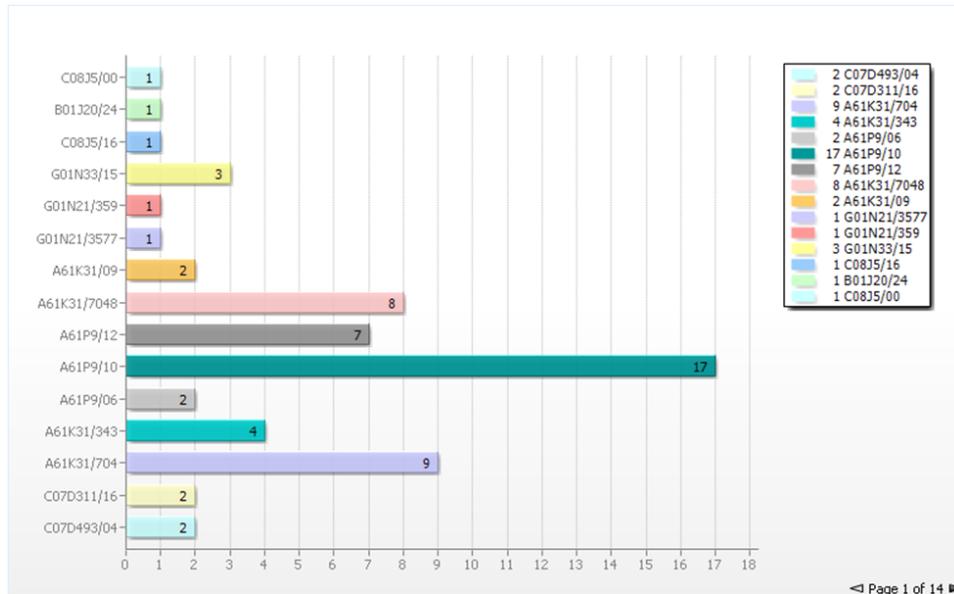


Figure 8. IPC Full Class Natural Ingredient and Traditional Medicine

From the country that provides inventor and applicant for natural ingredient and traditional medicine on figure 9. Can be seen that majority in utilization still in Asia region do by 15 China and 5 Korea. It means Asia

region with rich biodiversity and natural resources still have huge potential for developing natural ingredient for traditional medicine.



Figure 9. Country for Inventor and Applicant for Natural Ingredient and Traditional Medicine

## 5. Conclusion

Diversification of medical herbs, especially in traditional medicine, innovation step to see the function of traditional medicine. Sophisticated framework through information patent can be primarily measure to see potential utilization by industrial uses.

With patent analysis, many advantages can be found especially for pharmacy industries to see competitiveness level in producing natural remedy as health medicine. Patent data for traditional medicine is can be defined as a result of the variation of technology that includes much useful of determining utilization traditional remedy.

In order to have a good result on Patent Analysis, need some basic information related to the subject we want to know. Especially in determine keyword of the main subject of data that want to search. The results of patent analysis can be used, both management strategic and application, especially in dissemination appropriate technology. The result of data can be assumed as;

1. The visual content of data patent with a description of primary database technology.
2. Management of valuing patent assessment, that generate the needs of technology to determine analysis generates a selective set of influential patents that deserve more intensive control in knowledge management.
3. Identify analysis of product development and trend of technologies
4. Managing patent portfolio and forecasting market research for industry application.

### **Acknowledgements**

I would like to acknowledge Center for Innovation Indonesia Institute of Sciences, especially Intellectual Property Right Division, for providing the opportunity through supporting this research and kindly cooperation, sharing information and software tool in patent searching in the field of traditional medicine data. In addition, our

gratitude also goes to all who are involved directly or indirectly in preparing this paper.

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